The Amateur in You, Part 1

What have you been pondering?

Install a lightning arrester on your coax

People who are new to ham radio don't always appreciate the benefit of erecting an outdoor antenna, until others complain about their signals, or until they themselves realize that people can't hear them very well. Some wonder whether putting up an outside antenna will attract lightning, however. When we encourage people to install an outdoor antenna, one that's above their roofs, we should also tell them to ground the antenna coax through a *surge suppressor*, also called a ***lightning arrester***.

Lightning is a strange beast, and although it's electricity, it doesn't seem to act the same as the electricity we use from our wall sockets or batteries. We often refer to the kind we generate for household use and entertainment, as ***current electricity***, while the kind that nature provides as ***static electricity***, even though all electricity follows the same laws of physics. Current electricity is produced by moving electric charges that reside within an electronic band of a metallic atom. They remain in that band until an electromotive force pushes them. Static electricity is produced by friction between insulating materials, such as glass, cloth, rubber, air, dust, and clouds.

When enough friction occurs, the static begins to accumulate, until the total voltage presented by the difference between the accumulation and a nearby opposite voltage contact, such as the ground, is great enough to overcome the distance (*indeed, about 3000 volts per millimeter!*) When this happens, the space between the two becomes ionized by the electric field, which creates a temporary and erratic, but effective conducting path between them. Once the ionized path is complete, the accumulated charges rush through the ionized path very suddenly, creating a very high-temperature discharge, often resulting in a very incandescent, blinding flash.

The purpose of a lightning arrester is to route static charge to ground *relatively slowly*. With one in place, the lightning is less likely to have to discharge quickly. So, will your rooftop antenna attract more lightning? Possibly, but if its coax is fed with a lightning arrester, the discharge will occur much slower than without one, and you might never notice the benefit.

If the water behind a large dam exceeds its rated capacity, the dam could burst, and the resulting torrent could cause quite a lot of destruction downstream. But if the same quantity of water was released much slower, the damage could be largely avoided. Lightning is deadly and damaging because it's a very quick movement of a lot of static charge. By slowing the rate of this discharge, the damaging effects of lightning can be reduced. A surge protector such as a lightning arrester does just that, and provides a relatively slow release of the charge, instead of completely blocking the charge until it becomes too large to hold back.

Some people advocate unplugging your coax during every lightning storm, and if that works for them, then I'm happy for them. Those people should keep in mind, however, that if the lightning jumped 500 feet to reach their antennas, the measly six feet of separation made by unplugging the coax is probably not going to stop it, even if the end of the coax is sitting in a glass jar.

Finally, like all electricity, lightning travels by means of a *field*, and if that field through the air is a better conductor than that through a wire, the lightning will prefer and jump through the air. By installing a lightning arrester, however, we've done what we could to avoid an otherwise bad day.

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